

Trend Study 27-2-03

Study site name: Ahlstrom Hollow.

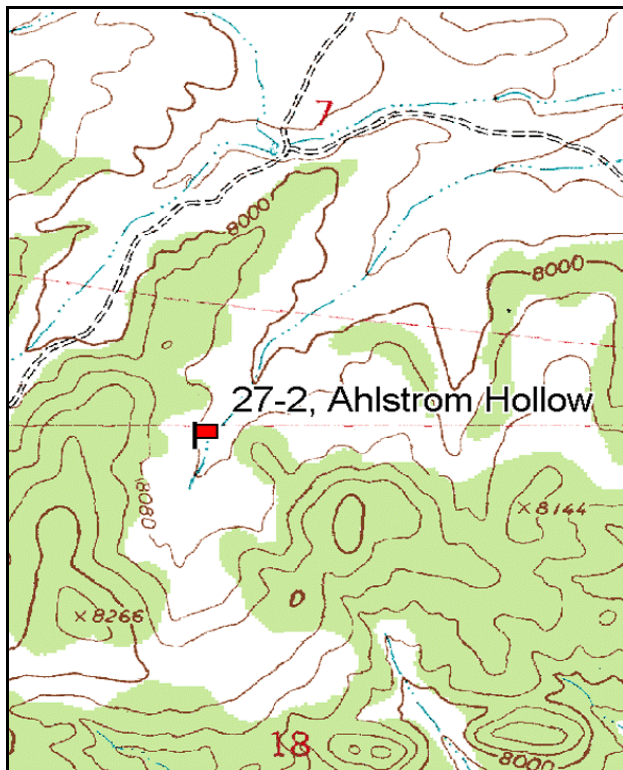
Vegetation type: Black Sagebrush.

Compass bearing: frequency baseline 190 degrees magnetic.

Frequency belt placement: line 1 (11 & 71ft), line 2 (34ft), line 3 (59ft), line 4 (95ft).

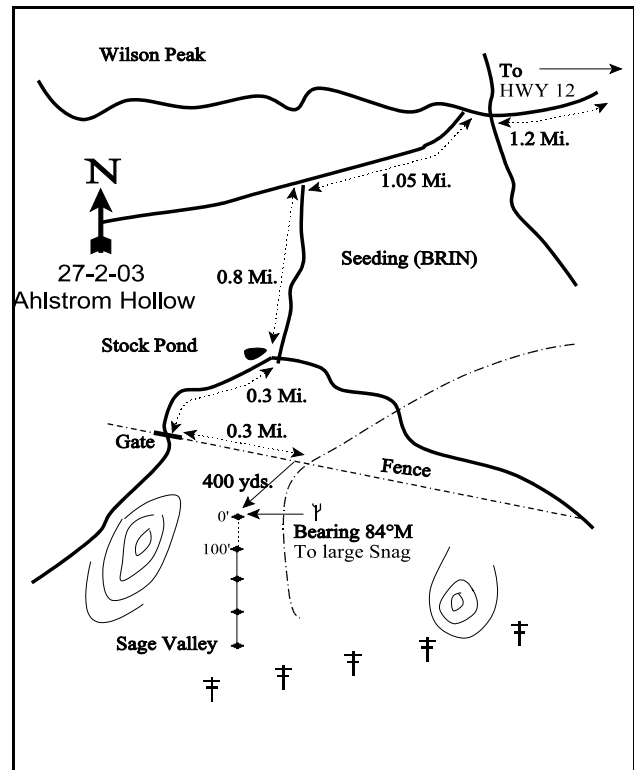
LOCATION DESCRIPTION

From the Bryce Canyon area, take SR 12 west towards Red Canyon. From the Forest Service boundary sign and mile marker 9, go 0.6 miles further west. Turn left onto Wilson Peak Rd #111, cross a cattleguard and go 1.2 miles to the Ahlstrom Hollow road intersection. Pass this 90° intersection and continue 0.05 miles on the Wilson Peak Road to a dirt road going off to the left at a 45° angle. Go down this road 1.05 miles to a fork. Bear left and continue 0.8 miles to a fork by a stock pond. Turn right and go 0.3 miles to a fence. Park here. Walk east along the fenceline up and over a ridge and down to the middle of the next valley. At the bottom of this valley, turn and walk up (south) along the bottom for about 400 yards to the 0-foot baseline, a 2-foot fencepost tagged #7150.



Map Name: Wilson Peak

Township 36S, Range 4W, Section 18



Diagrammatic Sketch

GPS: NAD 27, UTM 12S 4170896 N, 388205 E

DISCUSSION

Ahlstrom Hollow - Trend Study No. 27-2

Although named Ahlstrom Hollow, this study is actually situated in a drainage north of the wide, open, revegetated valley that is Ahlstrom Hollow. The small valley sampled by this trend study is above Johnson Bench, an area seeded mainly with smooth brome and other grasses. This particular black sagebrush-rabbitbrush valley shows little evidence of the seeding treatments done in the early 1950's. Surrounded by pinyon-juniper woodland and mountain mahogany ridges, the valley supports a mixture of black sagebrush, rabbitbrush, and grasses with a scattered population of bitterbrush. The valley drains to the northeast via an intermittent wash. Located on the west side of the valley at 8,000 feet in elevation, the transect has an east-southeast aspect and a slope that varies from 8-10%. The area is used by deer, elk, and cattle. Pellet group transect data collected in 2003 estimated 31 elk, 7 deer, and 32 cow days use/acre (76 edu/ha, 18 ddu/ha, and 79 cdu/ha) on the site. Cattle pats were fairly fresh indicating recent grazing, while deer and elk pellets appeared to be from spring and early summer.

The presence of black sagebrush throughout the whole valley would normally indicate shallow soils in the 8-10 inch range. However, the soil on the site is relatively deep with an average effective rooting depth of almost 18 inches. Texture analysis indicates it to be a sandy loam with a mildly alkaline pH (7.4). There is a high percentage of gravel in the profile, but the soil surface has very little rock or pavement cover. At this relatively high elevation and moderately deep soils, one would expect to find mountain big sagebrush. It may be that the gravelly nature of the soil or some subsurface physical or physiological barrier makes this a marginal site for mountain big sagebrush. The soil appears to be more shallow around the edges of the valley. There is evidence of past erosion and serious gully formation, especially on the surrounding hillsides. An erosion condition class assessment completed in 2003 resulted in a stable rating for soils. Bare ground has been moderate to high since 1992, and the ratio of protective cover (vegetation, litter, and cryptogams) to bare soil has steadily decreased with each reading since 1992, being estimated at 2.0 in 2003.

Black sagebrush is the dominant shrub over most of the valley, although rabbitbrush is prevalent in the bottoms. Black sagebrush density was estimated at 9,680 plants/acre in 1997 and 8,120 in 2003. A fire burned through a portion of the site between the 1997 and 2003 surveys, and accounts for some of the loss in density. The number of young plants in the population also declined in 2003. The black sagebrush population has maintained a healthy condition over all years with a decent proportion of young, moderately low decadence, and normal vigor. Utilization of black sagebrush has been mostly light to moderate in all readings. Annual leaders on black sagebrush had averaged 1.6 inches of growth when the site was read in mid-July of 2003. A few bitterbrush were encountered on the frequency belts even though it appears to be more common in the lower part of the valley. Bitterbrush is a preferred forage species, and displays moderate to heavy hedging in all years. Bitterbrush plants are large, spreading, and vigorous with annual leaders averaging 3 inches of growth in 2003.

Low and dwarf rabbitbrush are also common on the site. In 2003, all rabbitbrush on the site was classified as low rabbitbrush while the species were split in previous readings. Combined rabbitbrush density has totaled from about 3,000-4000 plants/acre over all surveys.

As this area is transitional/summer range for big game, and also grazed by livestock, grasses are an important component of this site. Eight perennial grass species have been sampled on the site in at least 1 year, with mutton bluegrass, needle-and-thread grass, and prairie junegrass being the most abundant. Only a few remnant individual smooth brome plants were found in 1987, but none were encountered in any other survey. Much of the biomass provided by grasses had been utilized in 2003 and some cattle trampling was evident. Sum of nested frequency of grasses declined between 1987 and 1992, remained nearly stable in 1997, and again decreased in 2003. Forbs are diverse but not particularly abundant. Many of the more palatable forb

species had been utilized by big game during the 1987 reading. They selected lupine, penstemon, and buckwheat. Utilization of forbs was not evident in 2003. Average cover of forbs was 6% in 1992, declining to 3% in 1997 and 2003. Most forbs are found only rarely with the more common species including owlclover, pussytoes, and longleaf phlox.

1992 TREND ASSESSMENT

Trend for soil is considered slightly down. Small areas throughout the site show signs of detectible soil movement, broken soil cover, and active gullying, especially on the surrounding hillsides. Percent bare ground has increased from 14% to 31%, while litter cover declined from 66% to 32%. The health and vigor of black sagebrush is good with a relatively high density. Trend for browse is up. Trend for the herbaceous understory is slightly down with sum of nested frequency values for grasses decreasing substantially. The forbs had a slight increase in their nested frequency value, but not enough to compensate for the loss to the grasses.

TREND ASSESSMENT

soil - slightly down (2)

browse - up (5)

herbaceous understory - slightly down (2)

1997 TREND ASSESSMENT

Trend for soil is up slightly due to a 26% increase in litter cover and a 29% decline in percent bare ground. Trend for black sagebrush is considered stable even though density has declined 40% since 1992. Density of black sagebrush was extremely high in 1992 at 16,200 plants/acre. The current estimated population density is similar to 1987 levels at 9,680 plants/acre. This is a more manageable density for a black sagebrush site and reduces intraspecific competition. Recruitment is adequate with 11% of the population consisting of young plants and a reproductive potential (percentage of seedlings to the population) of 12%. Percent decadence has also declined from 23% to 14%. Utilization is mostly light and vigor is normal on most plants. Trend for the herbaceous understory is stable. Sum of nested frequency of grasses has remained similar even though percent cover (effected by the timing of precipitation) of grasses has declined sharply. Frequency of forbs increased slightly but cover was also lower compared to 1992. Nested frequency of prairie junegrass (dependant on early season precipitation) declined significantly while frequency of needle-and-thread increased significantly.

TREND ASSESSMENT

soil - up slightly (4)

browse - stable (3)

herbaceous understory - stable (3)

2003 TREND ASSESSMENT

Trend for soil is slightly down. Bare soil increased from 22% to 38%, and litter cover declined from 43% to 34%. These changes translate into less protective cover on the soil surface, thus increasing the erosion potential of the site. Erosion remains low at the present time. Trend for browse is slightly down. Black sagebrush has a lower population density in 2003 due to plant mortality caused by a fire that burned a portion of the site. Recruitment declined in 2003 and percent decadence slightly increased. Overall, the population remains healthy. Trend for the herbaceous understory is slightly down. Sum of nested frequency of perennial grasses declined by 15% while that of perennial forbs declined by 41%. These changes are drought related and should improve with better precipitation.

TREND ASSESSMENT

soil - slightly down (2)

browse - slightly down (2)

herbaceous understory - slightly down (2)

HERBACEOUS TRENDS --

Management unit 27 , Study no: 2

T y p e	Species	Nested Frequency				Average Cover %		
		'87	'92	'97	'03	'92	'97	'03
G	Agropyron dasystachyum	-	-	-	2	-	-	.00
G	Agropyron trachycaulum	_a 8	_a 12	_{ab} 21	_b 46	.42	.11	.62
G	Bouteloua gracilis	_c 96	_b 69	_b 64	_a 27	2.23	.72	.29
G	Bromus inermis	2	-	-	-	-	-	-
G	Bromus tectorum (a)	-	-	3	-	-	.00	-
G	Koeleria cristata	_b 148	_b 134	_a 89	_a 71	3.09	.98	.92
G	Oryzopsis hymenoides	-	-	-	-	.00	-	-
G	Poa fendleriana	_a 129	_b 232	_b 201	_b 187	7.53	2.88	4.38
G	Poa secunda	_c 229	_a 5	_b 36	_{ab} 23	.01	.81	.24
G	Stipa comata	_b 130	_a 80	_{ab} 111	_{ab} 107	1.95	1.31	2.99
G	Stipa lettermani	_a -	_{bc} 29	_c 34	_{ab} 9	.68	.58	.21
G	Vulpia octoflora (a)	-	-	-	3	-	-	.00
Total for Annual Grasses		0	0	3	3	0	0.00	0.00
Total for Perennial Grasses		742	561	556	472	15.94	7.42	9.67
Total for Grasses		742	561	559	475	15.94	7.42	9.68
F	Agoseris glauca	_a -	_a -	_a 1	_b 36	-	.00	.23
F	Alyssum alyssoides (a)	-	-	-	-	-	-	.01
F	Ambrosia spp.	-	3	-	-	.06	-	-
F	Antennaria rosea	7	6	8	-	.04	.33	-
F	Androsace septentrionalis (a)	-	5	3	-	.04	.00	-
F	Arabis spp.	_a -	_b 6	_b 12	_a -	.02	.03	-
F	Aster chilensis	-	-	7	-	-	.01	-
F	Castilleja linariaefolia	-	-	-	8	-	-	.02
F	Calochortus nuttallii	-	-	-	2	-	-	.00
F	Castilleja spp.	-	-	-	-	-	-	.00
F	Chenopodium leptophyllum(a)	-	-	-	2	-	-	.00
F	Comandra pallida	-	-	1	-	-	.00	-
F	Collinsia parviflora (a)	-	-	-	8	-	-	.02
F	Crepis acuminata	-	-	-	3	-	-	.00
F	Cryptantha bakeri	_c 60	_b 12	_b 20	_a -	.06	.05	-
F	Cruciferae	6	3	-	-	.00	-	-

Type	Species	Nested Frequency				Average Cover %		
		'87	'92	'97	'03	'92	'97	'03
F	Cymopterus spp.	-	-	1	-	-	.00	-
F	Descurainia pinnata (a)	-	-	a-	b ³⁵	-	-	.68
F	Draba spp. (a)	-	-	-	2	-	-	.01
F	Erigeron eatonii	ab ¹⁴	b ²⁷	a ²	ab ¹¹	.33	.01	.02
F	Erigeron pumilus	ab ¹¹	a ¹	b ²²	ab ¹¹	.15	.20	.05
F	Eriogonum racemosum	6	13	14	8	.18	.16	.02
F	Eriogonum umbellatum	20	12	18	15	.11	.20	.26
F	Euphorbia robusta	b ¹¹	a ³	a ⁴	a-	.18	.06	-
F	Gayophytum ramosissimum(a)	-	-	14	1	-	.03	.01
F	Heterotheca villosa	b ¹⁵	a ³	a ²	ab ⁵	.15	.03	.06
F	Holosteum umbellatum (a)	-	-	3	-	-	.00	-
F	Lappula occidentalis (a)	-	-	a ⁵	b ⁵³	-	.01	1.39
F	Lotus utahensis	b ³⁴	ab ²¹	a ¹³	a ¹¹	.33	.25	.05
F	Lupinus argenteus	-	-	-	2	-	-	.00
F	Microsteris gracilis (a)	-	-	b ⁶¹	a ²	-	.17	.00
F	Oenothera pallida	-	-	3	7	-	.00	.07
F	Orthocarpus luteus (a)	a ²¹	b ¹²¹	b ¹¹¹	a ³³	2.70	1.43	.19
F	Penstemon comarrhenus	c ³⁶	ab ¹⁴	b ¹²	a-	1.01	.05	-
F	Penstemon spp.	-	-	8	1	-	.07	.00
F	Phlox longifolia	a ²⁹	b ⁶⁶	b ⁷²	a ²¹	.30	.35	.07
F	Polygonum douglasii (a)	-	b ²⁵	b ²⁶	a-	.06	.07	-
F	Taraxacum officinale	a-	ab ⁷	b ⁸	ab ²	.39	.05	.00
F	Tragopogon dubius	2	-	5	-	-	.01	-
F	Trifolium kingii	a-	ab ⁶	b ⁹	ab ¹	.01	.02	.00
F	Unknown forb-perennial	1	-	-	-	-	-	-
Total for Annual Forbs		21	151	223	136	2.81	1.73	2.33
Total for Perennial Forbs		252	203	242	144	3.37	1.92	0.91
Total for Forbs		273	354	465	280	6.18	3.65	3.24

Values with different subscript letters are significantly different at alpha = 0.10

BROWSE TRENDS --

Management unit 27 , Study no: 2

Type	Species	Average Cover %		
		'92	'97	'03
B	Artemisia nova	24.25	21.39	15.10
B	Chrysothamnus depressus	.67	-	-
B	Chrysothamnus viscidiflorus viscidiflorus	4.70	1.90	6.95
B	Juniperus osteosperma	.15	.85	.85
B	Leptodactylon pungens	2.34	.64	.67
B	Opuntia spp.	.03	.00	.00
B	Purshia tridentata	.38	.03	-
B	Tetradymia canescens	.09	.24	.06
Total for Browse		32.63	25.07	23.64

BROWSE TRENDS--

Management unit 27 , Study no: 2

Species	Strip Frequency		
	'92	'97	'03
Artemisia nova	98	98	57
Chrysothamnus depressus	33	31	0
Chrysothamnus viscidiflorus viscidiflorus	52	27	62
Juniperus osteosperma	1	2	1
Leptodactylon pungens	49	42	31
Opuntia spp.	2	1	1
Purshia tridentata	5	2	1
Tetradymia canescens	14	11	12

CANOPY COVER, LINE INTERCEPT --

Management unit 27 , Study no: 2

Species	Percent Cover	
	'97	'03
Artemisia nova	-	15.88
Chrysothamnus viscidiflorus viscidiflorus	-	6.90
Juniperus osteosperma	1.60	1.96
Leptodactylon pungens	-	.23
Purshia tridentata	-	.50
Tetradymia canescens	-	.08

KEY BROWSE ANNUAL LEADER GROWTH --
Management unit 27 , Study no: 2

Species	Average leader growth (in)
	'03
Artemisia nova	1.6
Purshia tridentata	3.0

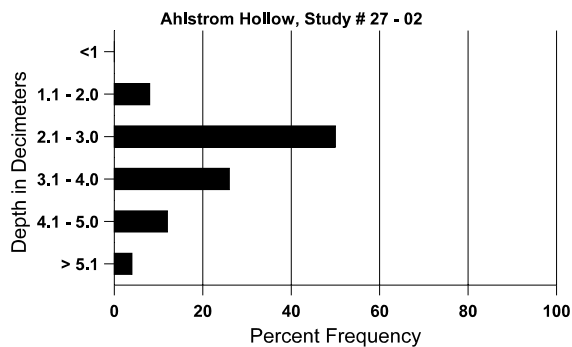
BASIC COVER --
Management unit 27 , Study no: 2

Cover Type	Average Cover %			
	'87	'92	'97	'03
Vegetation	5.50	47.05	38.87	38.60
Rock	1.25	7.93	.07	.54
Pavement	12.75	0	7.14	4.17
Litter	66.25	31.65	42.92	33.63
Cryptogams	0	.41	.46	.04
Bare Ground	14.25	31.40	22.36	37.97

SOIL ANALYSIS DATA --
Management unit 27, Study no: 2, Study Name: Ahlstrom Hollow

Effective rooting depth (in)	Temp °F (depth)	pH	% sand	% silt	% clay	%OM	PPM P	PPM K	dS/m
17.6	65.3 (14.8)	7.4	66.4	19.1	14.6	2.5	15.9	86.4	0.5

Stoniness Index



PELLET GROUP DATA --

Management unit 27 , Study no: 2

Type	Quadrat Frequency			Days use per acre (ha)
	'92	'97	'03	
Rabbit	30	11	13	-
Elk	22	7	12	31 (76)
Deer	6	14	8	7 (18)
Cattle	3	6	8	32 (79)

BROWSE CHARACTERISTICS --

Management unit 27 , Study no: 2

		Age class distribution (plants per acre)					Utilization				
Y e a r	Plants per Acre (excluding seedlings)	Seedling	Young	Mature	Decadent	Dead	% moderate	% heavy	% decadent	% poor vigor	Average Height Crown (in)
<i>Artemisia nova</i>											
87	9532	2600	2333	6133	1066	-	33	13	11	0	16/20
92	16200	1020	3400	9020	3780	-	22	2	23	4	-/-
97	9680	1140	1100	7220	1360	420	5	0	14	4	16/27
03	8120	-	480	6000	1640	2580	9	0	20	4	15/23
<i>Chrysothamnus depressus</i>											
87	3132	800	266	2733	133	-	17	15	4	0	4/10
92	1920	-	1000	920	-	-	5	1	0	0	-/-
97	1900	-	40	1860	-	-	0	0	0	0	10/10
03	0	-	-	-	-	-	0	0	0	0	-/-
<i>Chrysothamnus viscidiflorus viscidiflorus</i>											
87	3332	733	466	2533	333	-	32	4	10	0	16/18
92	4080	20	1600	2360	120	-	4	.49	3	.98	-/-
97	900	-	20	780	100	-	0	0	11	2	14/20
03	4300	-	20	4120	160	-	0	0	4	.46	12/18
<i>Juniperus osteosperma</i>											
87	0	-	-	-	-	-	0	0	-	0	-/-
92	20	-	20	-	-	-	100	0	-	0	-/-
97	40	-	20	20	-	-	0	0	-	0	-/-
03	20	-	-	20	-	-	0	0	-	0	-/-
<i>Leptodactylon pungens</i>											
87	0	-	-	-	-	-	0	0	0	0	-/-
92	5040	-	420	4540	80	-	0	0	2	2	-/-
97	2780	60	220	2520	40	80	0	0	1	1	6/6
03	1720	-	40	1580	100	-	0	0	6	5	5/7

		Age class distribution (plants per acre)					Utilization				
Y e a r	Plants per Acre (excluding seedlings)	Seedling	Young	Mature	Decadent	Dead	% moderate	% heavy	% decadent	% poor vigor	Average Height Crown (in)
Opuntia spp.											
87	133	-	-	133	-	-	0	0	0	0	3/8
92	120	-	100	-	20	-	0	0	17	0	-/-
97	20	-	20	-	-	-	0	0	0	0	-/-
03	20	-	-	20	-	-	0	0	0	0	-/-
Purshia tridentata											
87	0	-	-	-	-	-	0	0	0	0	-/-
92	100	-	80	20	-	-	0	60	0	0	-/-
97	40	-	-	40	-	-	50	50	0	0	21/43
03	20	-	-	-	20	40	0	100	100	0	19/59
Tetradymia canescens											
87	266	-	-	266	-	-	75	0	0	0	9/9
92	420	-	200	200	20	-	14	5	5	0	-/-
97	400	60	160	240	-	-	0	0	0	0	9/11
03	300	-	20	260	20	-	0	0	7	7	9/12